CLAIMS

1. An apparatus comprising:

a first circuit configured to generate a plurality of difference values by calculating an absolute difference between each pixel from a current block and a corresponding pixel from a reference block substantially simultaneously;

a second circuit configured to generate a plurality of sum values by adding said difference values; and

a third circuit configured to generate at least one motion vector in response to said sum values.

2. The circuit according to claim 1, wherein said first circuit comprises a plurality of processing elements each configured to generate one of said difference values.

3. The circuit according to claim 2, wherein said processing elements are logically configured as a two-dimensional array receiving said pixels from said current block and said reference block on a first side of said array and presenting said difference values on a second side of said array.

4. The circuit according to claim 1, wherein said second circuit comprises a plurality of adder circuits each configured to generate one of said sum values substantially simultaneously.

5. The circuit according to claim 4, wherein each of said adder circuits comprises a plurality of stages connected in series, (i) a first of said stages receives a portion of said difference values and (ii) a last of said stages generates said one sum value.

6. The circuit according to claim 1, wherein said third circuit comprises:

an adder circuit configured to generate a plurality of first intermediate values from said sum values;

a storage circuit configured to generate a plurality of second intermediate values from said first intermediate values as said current block is moved through a search window; and

a select circuit configured to generate said motion vector from said second intermediate values.

7. The circuit according to claim 6, wherein each of said second intermediate values corresponds to one of a plurality of partition modes for said current block for variable block size motion estimation.

8. The circuit according to claim 1, wherein said third circuit is further configured to generate a sum of absolute difference value corresponding to said motion vector.

9. The circuit according to claim 1, wherein each of said sum values corresponds to a smallest partition of said current block.

10. The circuit according to claim 1, wherein (i) said first circuit comprises a plurality of processing elements each configured to generate one of said difference values, (ii) said second circuit comprises a plurality of first adder circuits each configured to generate one of said sum values and (iii) said third circuit comprises:

a second adder circuit configured to generate a plurality of intermediate values from said sum values;

a storage circuit configured to generate a plurality of second intermediate values from said intermediate values as said current block is moved through a search window; and

a select circuit configured to generate said motion vector from said second intermediate values.

11. A method for motion estimation, comprising the steps of:

(A) generating a plurality of difference values by calculating an absolute difference between each pixel from a current block and a corresponding pixel from a reference block substantially simultaneously;

(B) generating a plurality of sum values by adding said difference values; and

(C) generating at least one motion vector in response to said sum values.

12. The method according to claim 11, wherein step (C) comprises the sub-step of:

generating a plurality of first intermediate values from said sum values, one of said intermediate values for each of a plurality of partitions of said current block.

13. The method according to claim 12, wherein step (C) further comprises the sub-step of:

generating a plurality of minimum values by retaining a smallest of said sum values for each of said intermediate values as said current block is moved through a search window.

14. The method according to claim 13, wherein step (C) further comprises the sub-step of:

generating a plurality of second intermediate values in response to said minimum values.

15. The method according to claim 14, wherein step (C) further comprises the sub-step of:

generating said motion vector by determining a best of said second intermediate values.

16. The method according to claim 11, wherein step (B) comprises the sub-step of:

generating a plurality of first intermediate values by adding a plurality of said difference values.

17. The method according to claim 16, wherein step (B) further comprises the sub-step of:

generating a plurality of second intermediate values by adding a plurality of said first intermediate values.

18. The method according to claim 11, wherein step (A) comprises the sub-step of:

generating a plurality of intermediate values each by calculating a difference between one of said pixels from said current block and one of said pixels from said reference block.

19. The method according to claim 18, wherein step (A) further comprises the sub-step of:

generating said difference values by calculating an absolute difference value for each of said intermediate values.

20. A circuit comprising:

means for generating a plurality of difference values by calculating an absolute difference between each pixel from a current block and a corresponding pixel from a reference block substantially simultaneously;

means for generating a plurality of sum values by adding said difference values substantially simultaneously; and

means for generating at least one motion vector in response to said sum values.